MATEMATISKA INSTITUTIONEN
STOCKHOLMS UNIVERSITET
Avd. Matematik

SJÄLVSTÄNDIGT ARBETE I MATEMATIK

Onsdagen den 28 mars kl. 9–10 presenterar Lotta Rehn-Molin sitt arbete "Gottfried Wilhelm Leibniz" (15 högskolepoäng, grundnivå).

Handledare: Paul Vaderlind

Plats: Sal 21, hus 5, Kräftriket

Abstract: This thesis aims to provide an overview of the life and ideas of the German philosopher and mathematician Gottfried Wilhelm Leibniz (1646-1716), with focus on his mathematics and the development of calculus.
Leibniz has played a very important role in the history of philosophy as well as in the history of mathematics, and he is known as one of the greatest thinkers of the 17th Century. In addition to his work on mathematics and philosophy, Leibniz also made rigorous contributions to physics, metaphysics, logic, epistemology, jurisprudence, history and geology.
Leibniz's philosophical view is mostly known for its optimism, including the idea that our Universe is the best of what God could possibly create. It was of great concern for Leibniz to investigate and give structure to the fundamental nature of being. He formulated his metaphysical view in terms of what he called simple substances, monads and a pre-established harmony.
During the 17th Century, mathematicians worked on advancing techniques for finding areas enclosed by curved lines (quadratures) and volumes enclosed by figures (cubatures). Leibniz argued that it is possible to transform figures whose equations include irrational numbers, so that the properties of those figures could be understood with infinite series of rational numbers. He found series to be useful for numerical approximations of areas, and as an example, he demonstrated that the area of a quarter of a circle with radius 1 can be expressed as

$$\pi/4 = 1/1 - 1/3 + 1/5 - 1/7 + ...$$

Leibniz spent 1672-1676 in Paris and during these years he developed the infinitesimal calculus and its notation. He invented the notation for integrals signifying a sum and introduced d signifying a difference as well as rules for how to use these. He described differentiation as finding the difference between elements within a series, and summation as finding sums of such differences between elements.

After Leibniz had published his first results on calculus in 1684 he received some criticism, especially regarding the concept of infinitely small quantities. He also got accused of having taken the ideas from Newton who had formulated similar theories years before which were just not yet published.
Today, calculus is commonly applied within many fields including; physical science, computer science, statistics, engineering, economics, business and medicine. The notation Leibniz developed for calculus might be his greatest contribution to mathematics, and it is taught in schools and used all around the world more than 300 years after its invention.

Alla intresserade är välkomna!